TURNKEY PRINTING SOLUTIONS

PCPR PRINTER

USER MANUAL

Reference 3108010 Preliminary
July - 2004

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EVOLUTIONS

Date	Issue	Modifications
07/2004	Preliminary	

INTRODUCTION

This manual contains the basic instructions to run your printer. Read it carefully before using your printer paying full attention to section concerning recommendations.

Axiohm

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1 TECHNICAL SPECIFICATIONS

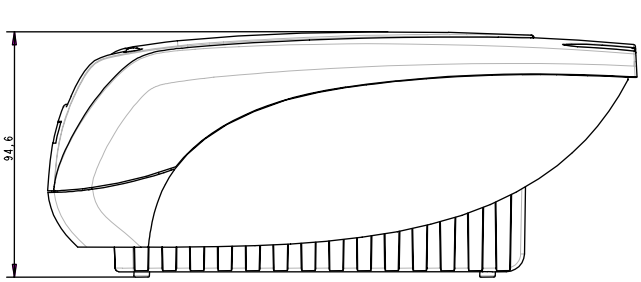
The following table gathers the main characteristics of the printing unit.

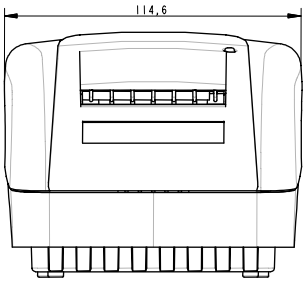
ITEM	VALUE	UNIT
Printing Mod	Graphic, text, bar code, logo	--
Printing method	Static thermal dot line printing	--
Card loading	Automatic	--
Number of resistor dots	384	dots
Resolution	8 horizontal & vertical	Dots/mm
Printing width*	48	mm
Max printing speed: USB recommended	80	mm/s
Card dim. Simple Double	86 x 54 171 x 54	mm
Head T° detection	By Thermistor	--
Paper feed pitch	1	Motor steps
	0.125	mm
Card detection	Opto-sensor	--
Vch (dot)	24	V DC
Power supply - INPUT	110 - 240 50 - 60	V DC Hertz
- OUTPUT	24 60	V DC Watt
Over all dimensions: Width	114.6	mm
Length	227.3	mm
Height	94.6	mm
Weight	635	g
Storage range	-25 to +55	°C
Relative humidity	20 to 85 no condensing	%
Operating range	+5 to +55	°C
Electrical lifetime	10^8	pulses on OE signal
Mechanical lifetime Simple card Double card	50 000 25 000	km
Logo + Users fonts - Memory space	48	Ko
Bars codes supported	Code 39 Code 128 A, B et C JAN(8) JAN(13) Interleaved 2 of 5 Codabar	--

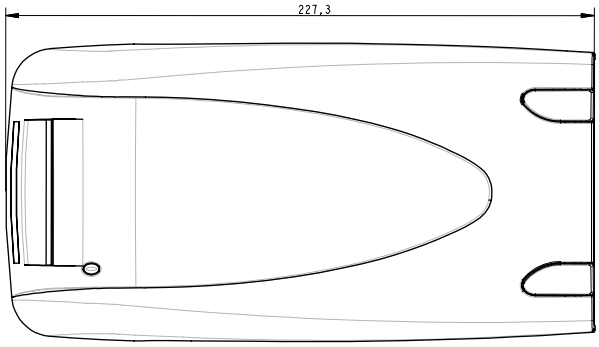
* Axiohm supplies a power supply adapted in the machine and guaranteed its use.

2 MECHANICAL FEATURES

2.1 External Dimensions

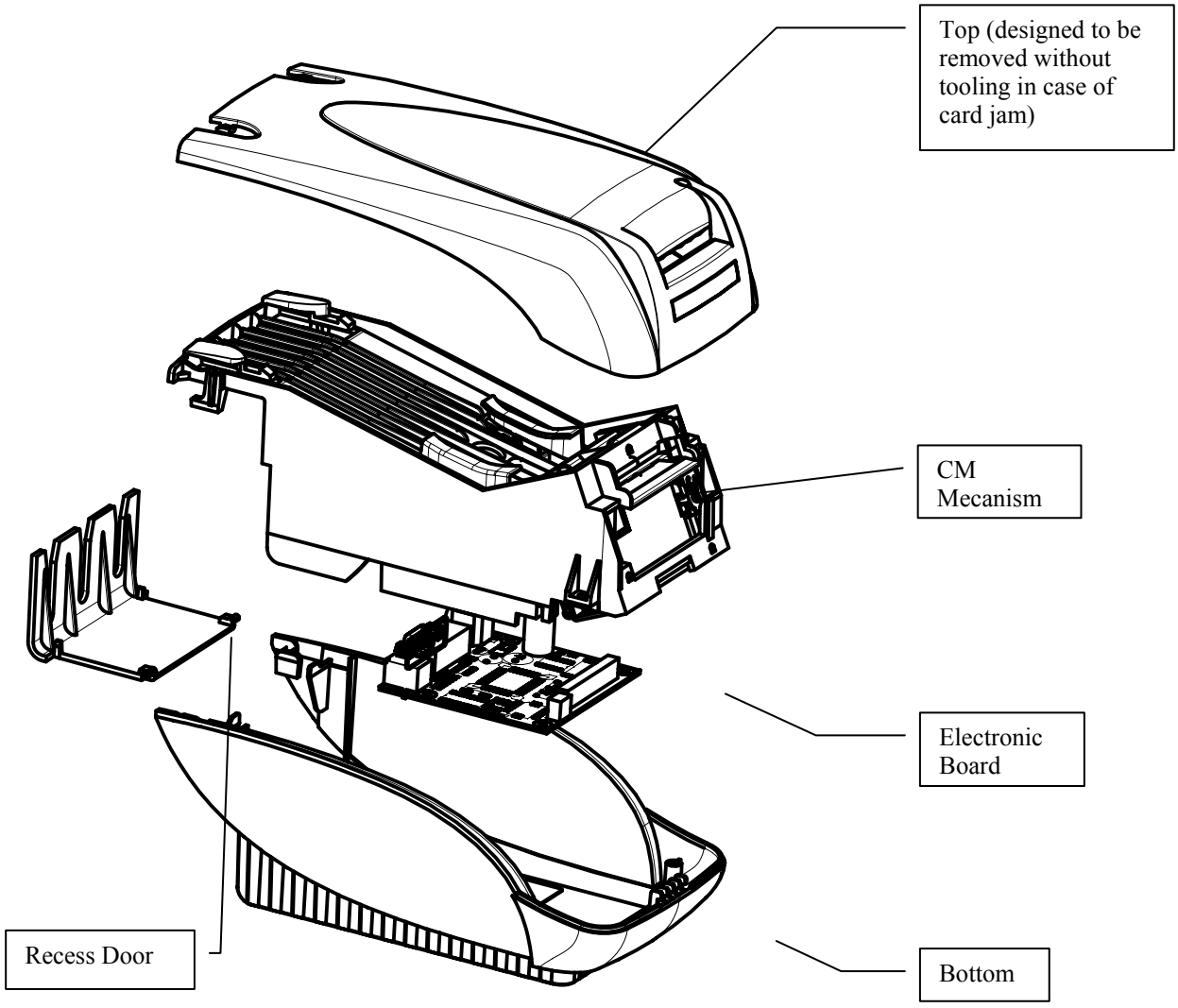






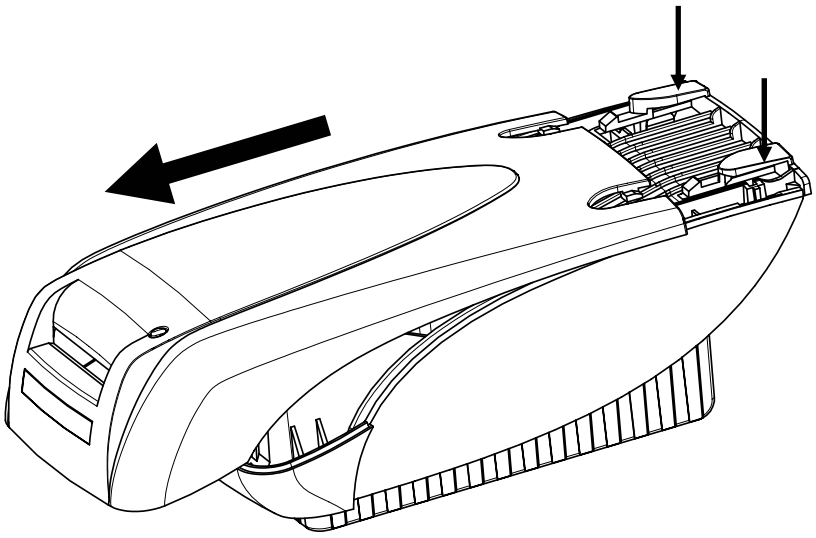
2.1.1 Technical architecture

The housing consist in 4 plastic parts: base part, top part, main frame and recess door.

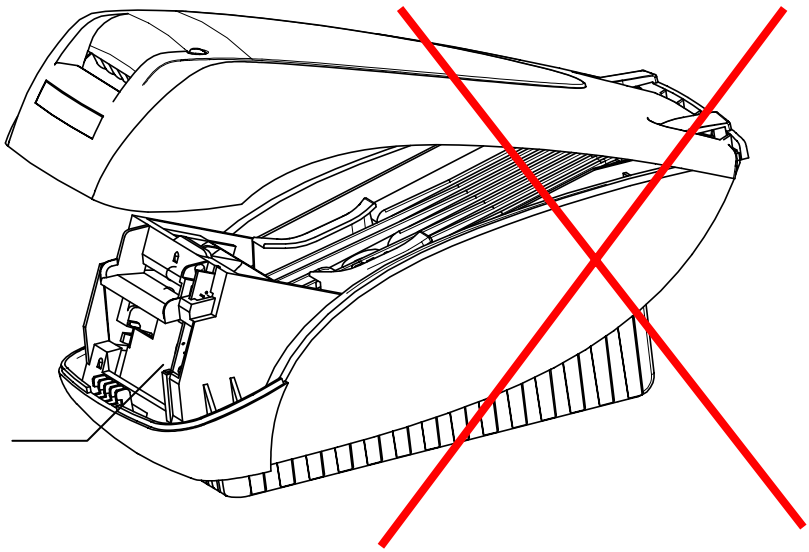


2.1.2 Opening the printer

To open the cover you have to:
- Push on the 2 rear buttons together.
- Keep pushing and pull the cover according to the direction shown bellow.



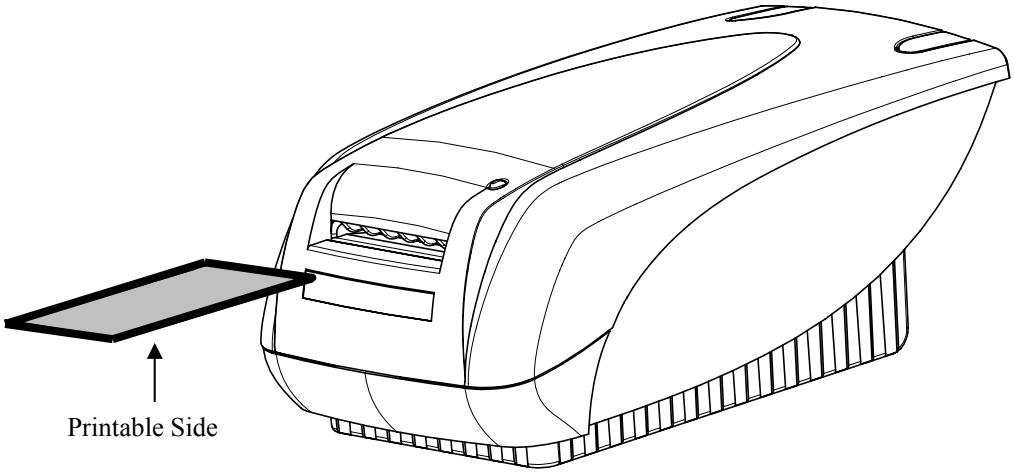
During this operation, take care to avoid any cover rotation (Could seriously damage the printer).



2.2 Card Management

2.2.1 Card loading

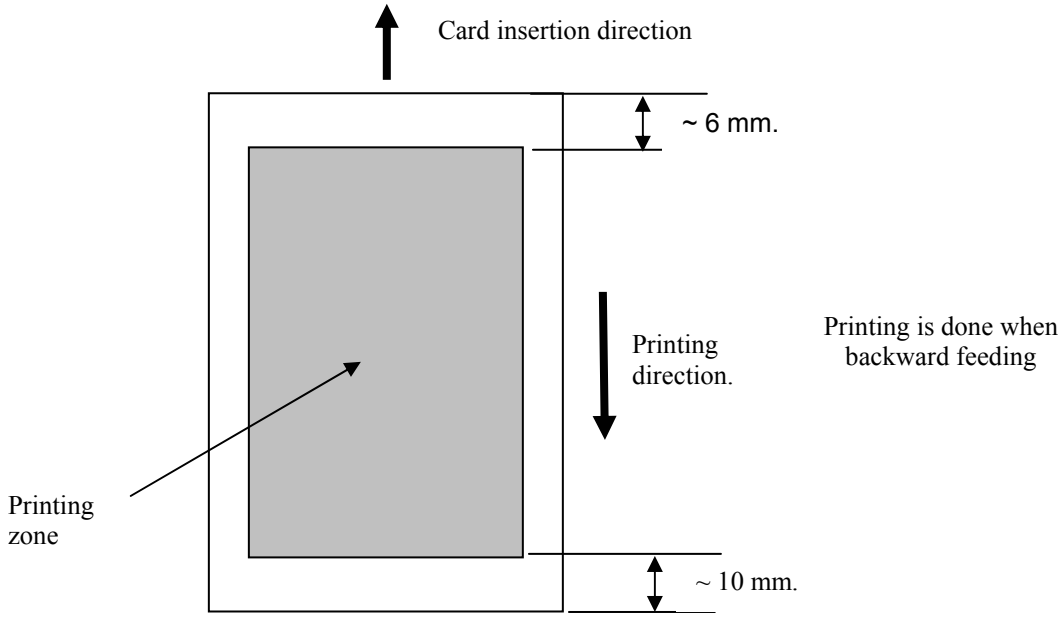
The printable side will be down when entering the printer.
The card is introduced by a slot located on the front of the printer, the complete introduction is managed according to control sequences sent by the customer application.
The same slot is used for card inlet and outlet.
The card is printed while fed backward for return to the operator.



NOTE: The card used must be the reference recommended by your printer supplier.

2.2.2 Printing zone

- Simple card: 70*48 mm
- Double card: 153*48mm



2.2.3 Recommended Card Media

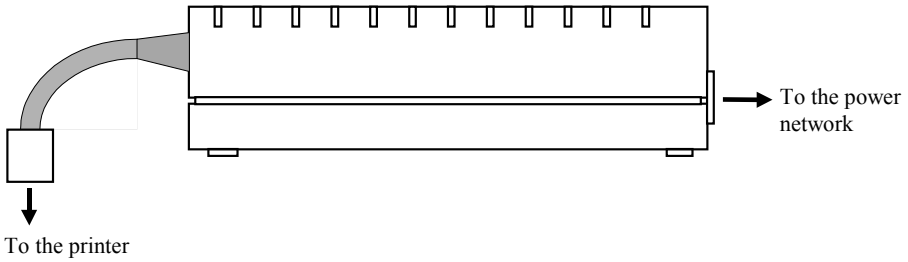
- No burns allowed on edges
- As the printable side must be detectable with a reflective opto, no preprinted areas have to be on this side.

Axiohm recommends to use the 3107996 Axiohm reference for a simple card and 3107997 for the double card.

3 INTERFACE BOARD FEATURE

3.1 Plugging & Connecting Your Printer

3.1.1 Connecting the power supply



The power supply should be a “SELV” type in order to meet safety standards.

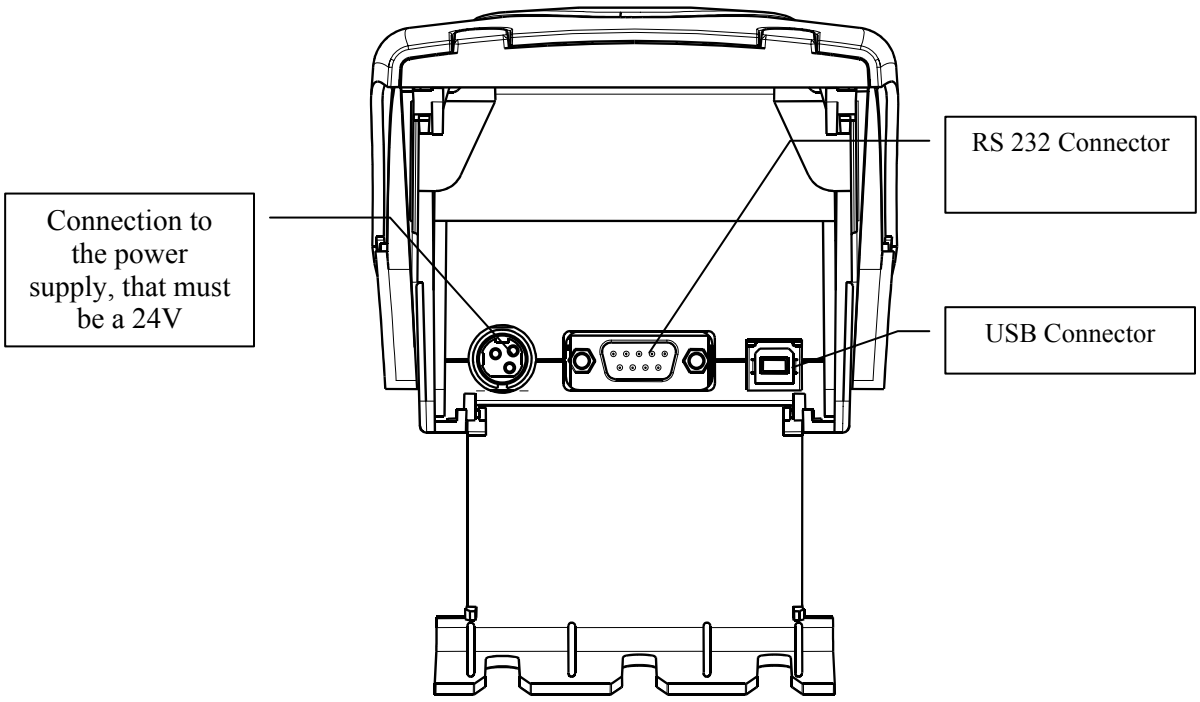
Product conformity validated with the Axiohm 3107329 power supply, in case of replacement, an equivalent model must be used.

Use of an inappropriate cable or power supply may seriously damage your printer and affect safety standards of the printer. The power supply main connector should be accessed to enable power disconnection.

The power supply cable connection to the printer must remain available during printer operation.

3.1.2 Connecting the terminal

Connections have to be set at the rear of printer: open the rear door and set the power supply and the interface cable as shown on the following drawing.



3.2 Communication's Management

Both RS232 and USB communication's interfaces are implemented.
The default communication mode is USB, if the USB is not connected, the RS232 is the applied interface.

Communication interfaces are SELV

3.2.1 RS232

The parameters of this interface will be following them:

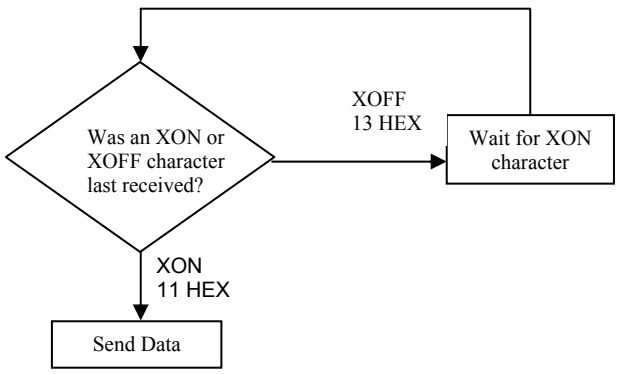
Baudrate	Data Bit	Stop Bit	Parity	Handshaking	Parity error processing
9600	8*	1*	Even	Xon/Xoff	Print"?"
19200		2	Odd	DTR/DSR*	Ignore*
38400			None*		
57600					
115200*					

These parameters will be stored in EEPROM and could be adjusted by control code sequences.

*: By default, these are the RS 232 communication interface parameters.

3.2.1.1 XON/XOFF Protocol

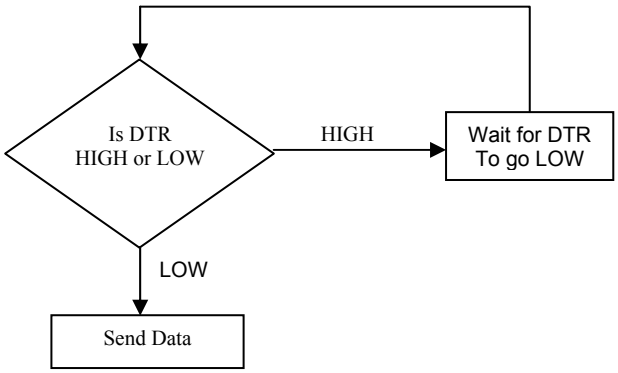
The XON/XOFF characters controls the information transfer between the printer and the host computer. The printer sends an XON character when it is ready to receive data and it sends an XOFF character when it cannot accept any more data. The software on the host computer must monitor the communication link as shown in the following flowchart in order to send data at the appropriate times.
If XON/XOFF has been selected, the printer also toggles the DTR signal, as described in the next section, but it does not look at the DSR signal to transmit data.



XON character = hexadecimal 11.
XOFF character = hexadecimal 13.

3.2.1.2 DTR/DSR Protocol

The DTR signal is used to control data transmission to the printer. It is driven low when the printer is ready to receive data and driven high when it cannot accept any more data.



3.2.2 USB Parameters

- USB V1.1
- Full Speed communication 12 Mbits/sec
- Single USB Connector (Peripheral mode)
-

Number	Type	Direction	Size	During	Description
00	Control	IN / OUT	8	-	Control end point
01	Interrupt	OUT	16	-	Real time commands
02	Bulk	OUT	64	-	For transmission of all printable datas and commands from host to printer
82	Bulk	IN	64	-	For return of all synchronous datas, status or other types of information except unsolicited status mode messages, from printer to host.

Vendor ID:
Axiohm USB Vendor Id = 0x05D9

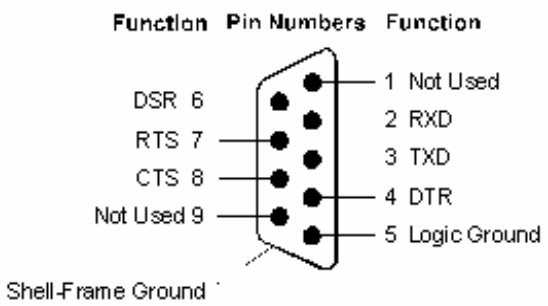
Product Id:
PCPR product Id = 0xA000

Remark : The interface USB is automatically detected, it is priority on the interface RS232.

3.2.3 Connectors

The following illustration shows the RS-232C communication connector and pin assignment. The connector is located at the rear of the printer, and is specified as male, DB9, 9-pin D-shell, with RTS and CTS pins connected together.

9-pin DB-9 Connector



3.3 Print Specification

3.3.1 Print density and density of receipt print lines

This function makes it possible to adjust the energy level of the print head to darken the printout. An adjustment should only be made when necessary. The factory setting is 100%.
Warning:
Choose an energy level no higher than necessary to achieve a dark printout.
Failure to observe this rule may result in a printer service call or voiding of the printer warranty. Consult your Axiohm technical support specialist if you have any questions.
When printing lines at high dot coverage (text or graphics), the printer automatically slows down to limit power consumption.

3.3.2 Duty cycle restrictions (printing solid blocks)

There are restrictions on the duty cycle because of the heat generated by the receipt thermal print head when printing solid blocks (regardless of the length of the block in relation to the print line). The restrictions are ambient temperature, the percentage of time (measured against one minute) of continuous solid printing, and the amount of coverage.
Caution: When the duty cycle approaches the limits shown in the table, the receipt print head will heat up. If print head temperature exceeds 65 °C, a safety feature will shut down the print head to prevent damage.

Another cause for duty cycle restriction is paper feed motor temperature increase due to continuous printing.

The maximum duty cycle for a typical receipt is 23%.

This value is defined for all the range temperature.

3.3.3 Character sets

Code page 858:

00 0	10 16	20 32	30 0 48	40 @ 64	50 P 80	60 ` 96	70 p 112	80 Ç 128	90 É 144	A0 á 160	B0 ⋮⋮⋮ 176	C0 └ 192	D0 ð 208	E0 Ó 224	F0 – 240
01 1	11 17	21 ! 33	31 1 49	41 A 65	51 Q 81	61 a 97	71 q 113	81 ü 129	91 æ 145	A1 í 161	B1 ▒ 177	C1 ┴ 193	D1 Đ 209	E1 ß 225	F1 ± 241
02 2	12 18	22 " 34	32 2 50	42 B 66	52 R 82	62 b 98	72 r 114	82 é 130	92 Æ 146	A2 ó 162	B2 ▓ 178	C2 ┬ 194	D2 Ê 210	E2 Ô 226	F2 ‗ 242
03 3	13 19	23 # 35	33 3 51	43 C 67	53 S 83	63 c 99	73 s 115	83 â 131	93 ô 147	A3 ú 163	B3 │ 179	C3 ├ 195	D3 Ë 211	E3 Ò 227	F3 ¾ 243
04 4	14 20	24 $ 36	34 4 52	44 D 68	54 T 84	64 d 100	74 t 116	84 ä 132	94 ö 148	A4 ñ 164	B4 ┤ 180	C4 ─ 196	D4 È 212	E4 õ 228	F4 ¶ 244
05 5	15 21	25 % 37	35 5 53	45 E 69	55 U 85	65 e 101	75 u 117	85 à 133	95 ò 149	A5 Ñ 165	B5 Á 181	C5 ┼ 197	D5 € 213	E5 Õ 229	F5 § 245
06 6	16 22	26 & 38	36 6 54	46 F 70	56 V 86	66 f 103	76 v 118	86 å 134	96 û 150	A6 ª 166	B6 Â 182	C6 ã 198	D6 Í 214	E6 µ 230	F6 ÷ 246
07 7	17 23	27 ' 39	37 7 55	47 G 71	57 W 87	67 g 103	77 w 119	87 ç 135	97 ù 151	A7 º 167	B7 À 183	C7 Ã 199	D7 Î 215	E7 þ 231	F7 ¸ 247
08 8	18 24	28 (40	38 8 56	48 H 72	58 X 88	68 h 104	78 x 120	88 ê 136	98 ÿ 152	A8 ¿ 168	B8 © 184	C8 ╚ 200	D8 Ï 216	E8 Þ 232	F8 º 248
09 9	19 25	29) 41	39 9 57	49 I 73	59 Y 89	69 i 105	79 y 121	89 ë 137	99 Ö 153	A9 ® 169	B9 ╣ 185	C9 ╔ 201	D9 ┘ 217	E9 Ú 233	F9 ¨ 249
0A 10	1A 26	2A * 42	3A : 58	4A J 74	5A Z 90	6A j 106	7A z 122	8A è 138	9A Ü 154	AA ¬ 170	BA ║ 186	CA ╩ 202	DA ┌ 218	EA Û 234	FA · 250
0B 11	1B 27	2B + 43	3B ; 59	4B K 75	5B [91	6B k 107	7B { 123	8B ï 139	9B ø 155	AB ½ 171	BB ╗ 187	CB ╦ 203	DB ▉ 219	EB Ù 235	FB ¹ 251
0C 12	1C 28	2C , 44	3C < 60	4C L 76	5C \ 92	6C l 108	7C | 124	8C î 140	9C £ 156	AC ¼ 172	BC ╝ 188	CC ╠ 204	DC ▄ 220	EC ý 236	FC ³ 252
0D 13	1D 29	2D - 45	3D = 61	4D M 77	5D] 93	6D m 109	7D } 125	8D ì 141	9D Ø 157	AD ¡ 173	BD ¢ 189	CD ═ 205	DD ¦ 221	ED Ý 237	FD ² 253
0E 14	1E 30	2E . 46	3E > 62	4E N 78	5E ^ 94	6E n 110	7E ~ 126	8E Ä 142	9E × 158	AE « 174	BE ¥ 190	CE ╬ 206	DE Ì 222	EE ¯ 238	FE ■ 254
0F 15	1F 31	2F / 47	3F ? 63	4F O 79	5F _ 95	6F o 111	7F △ 127	8F Å 143	9F ƒ 159	AF » 175	BF ┐ 191	CF ¤ 207	DF ▀ 223	EF ´ 239	FF 255

Code page 437:

00 0	10 16	20 SP 32	30 0 48	40 @ 64	50 P 80	60 ` 96	70 p 112	80 Ç 128	90 É 144	A0 á 160	B0 ⁝ 176	C0 └ 192	D0 ╨ 208	E0 ∝ 224	F0 ≡ 240
01 1	11 17	21 ! 33	31 1 49	41 A 65	51 Q 81	61 a 97	71 q 113	81 ü 129	91 æ 145	A1 í 161	B1 ▒ 177	C1 ┴ 193	D1 ╤ 209	E1 β 225	F1 ± 241
02 2	12 18	22 " 34	32 2 50	42 B 66	52 R 82	62 b 98	72 r 114	82 é 130	92 Æ 146	A2 ó 162	B2 ▓ 178	C2 ┬ 194	D2 ╥ 210	E2 Γ 226	F2 ≥ 242
03 3	13 19	23 # 35	33 3 51	43 C 67	53 S 83	63 c 99	73 s 115	83 â 131	93 ô 147	A3 ú 163	B3 │ 179	C3 ├ 195	D3 ╙ 211	E3 π 227	F3 ≤ 243
04 4	14 20	24 $ 36	34 4 52	44 D 68	54 T 84	64 d 100	74 t 116	84 ä 132	94 ö 148	A4 ñ 164	B4 ┤ 180	C4 ─ 196	D4 ╘ 212	E4 Σ 228	F4 ⌠ 244
05 5	15 21	25 % 37	35 5 53	45 E 69	55 U 85	65 e 101	75 u 117	85 à 133	95 ò 149	A5 Ñ 165	B5 ╡ 181	C5 ┼ 197	D5 ╒ 213	E5 σ 229	F5 ⌡ 245
06 6	16 22	26 & 38	36 6 54	46 F 70	56 V 86	66 f 103	76 v 118	86 å 134	96 û 150	A6 ª 166	B6 ╢ 182	C6 ╞ 198	D6 ╓ 214	E6 µ 230	F6 ÷ 246
07 7	17 23	27 ' 39	37 7 55	47 G 71	57 W 87	67 g 103	77 w 119	87 ç 135	97 ù 151	A7 º 167	B7 ╖ 183	C7 ╟ 199	D7 ╫ 215	E7 τ 231	F7 ≈ 247
08 8	18 24	28 (40	38 8 56	48 H 72	58 X 88	68 h 104	78 x 120	88 ê 136	98 ÿ 152	A8 ¿ 168	B8 ╕ 184	C8 ╚ 200	D8 ╪ 216	E8 ϕ 232	F8 ° 248
09 9	19 25	29) 41	39 9 57	49 I 73	59 Y 89	69 i 105	79 y 121	89 ë 137	99 Ö 153	A9 ⌐ 169	B9 ╣ 185	C9 ╔ 201	D9 ┘ 217	E9 Θ 233	F9 ∙ 249
0A 10	1A 26	2A * 42	3A : 58	4A J 74	5A Z 90	6A j 106	7A z 122	8A è 138	9A Ü 154	AA ¬ 170	BA ║ 186	CA ╩ 202	DA ┌ 218	EA Ω 234	FA · 250
0B 11	1B 27	2B + 43	3B ; 59	4B K 75	5B [91	6B k 107	7B { 123	8B ï 139	9B ¢ 155	AB ½ 171	BB ╗ 187	CB ╦ 203	DB ▉ 219	EB δ 235	FB √ 251
0C 12	1C 28	2C , 44	3C < 60	4C L 76	5C \ 92	6C l 108	7C | 124	8C î 140	9C £ 156	AC ¼ 172	BC ╝ 188	CC ╠ 204	DC ▄ 220	EC ∞ 236	FC n 252
0D 13	1D 29	2D - 45	3D = 61	4D M 77	5D] 93	6D m 109	7D } 125	8D ì 141	9D ¥ 157	AD ¡ 173	BD ╜ 189	CD ═ 205	DD ▌ 221	ED ∅ 237	FD ² 253
0E 14	1E 30	2E . 46	3E > 62	4E N 78	5E ^ 94	6E n 110	7E ~ 126	8E Ä 142	9E Pt 158	AE « 174	BE ╛ 190	CE ╬ 206	DE ▐ 222	EE ε 238	FE ■ 254
0F 15	1F 31	2F / 47	3F ? 63	4F O 79	5F _ 95	6F o 111	7F DEL △ 127	8F Å 143	9F ƒ 159	AF » 175	BF ┐ 191	CF ╧ 207	DF ▀ 223	EF ∩ 239	FF BLANK 255

3.3.4 Characters Print Modes

Available print modes:

- Standard
- Double High
- Double Wide
- Underlined
- Reverse

Characters sizes for the Standard:

- Characters per Inch: 16.9
- Characters per Line: 32 for 60.0 mm Paper
- Cell Size: 12 x 24 Dots

4 CONFIGURATION MENU

Printers are generally shipped with all the functions and parameters pre-set at the factory.
The configuration can be changed by using software commands as described in the "Configuration Commands" chapter.

4.1 List of parameters that can be changed

- Communication Options
- Diagnostics Modes
- Emulation / software Options

- Hardware Options**Set Hardware Options** Print density 80% 90% **100% *** 110% 120% Pre-Heating Enabled **Disabled ***	Default Code Page **858 *** 437	**Set Communication Options** Interface Type RS232 USB RS232 Baud Rate **115200 *** 57600 38400 19200 9600 RS232 Data Bits **8 *** RS232 Stop Bit(s) **1 *** 2 RS232 Parity **No Parity *** Even Parity Odd Parity RS232 Flow Control **DTR/DSR *** XON/XOFF

*** Standard factory default settings** (*for further information, please contact your distributor or Axiohm Technical Support Team at* ***www.axiohm.biz***)

5 SELF TEST TICKET DESCRIPTION

The self test ticket can be printed by pressing both Reset and Paper feed button and releasing the Reset button.
Here is the description of all the lines that you can read when you print a self test.

Model Number: This is a 8 digit number fixed by Axiohm.

Serial Number: This is a 10 digits number fixed by Axiohm.*

*Serial number will be encoded as follows :

First letter:	C or D
Next two digits:	year of production
Next two digits:	week of production
Next 5 digits:	incremental number that is reset every Monday morning.

Example: **C or D000906623**
=> Board manufactured week 9 of the year 2000, 6623 th product manufactured that week.

Firmware:

Boot Revision	4 digits revision number fixed by Axiohm.
Boot CRC	Boot code CRC.
Flash Revision	4 digits revision number fixed by Axiohm.
Flash CRC	Flash Main code CRC.

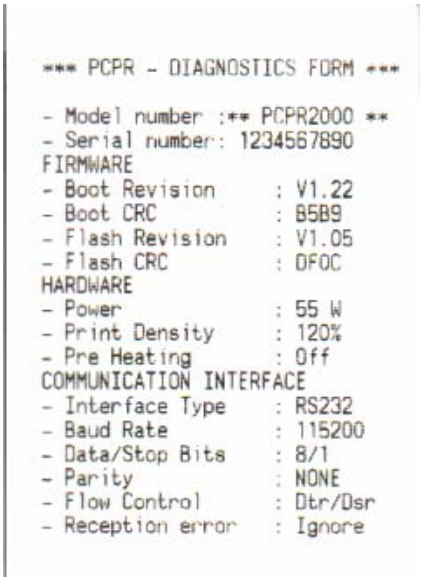
Hardware:

Max Power	Maximum average power drawn from power supply
Print Density	Percentage of the nominal heating time value for specified paper.
Pre Heating	This mode is used to maintain print head temperature above minimum value when enabled

Communication Interface:

Interface Type	Type's interface that you used
Baud Rate	Baud rate Value.
Data Bits	Number of data bits
Stop Bit(s)	Number of stop bit(s)
Parity	Type of parity to control frame validity
Flow Control	Hardware or software handshaking.
Reception Errors	Indicates which action is to be done when a wrong data is received.

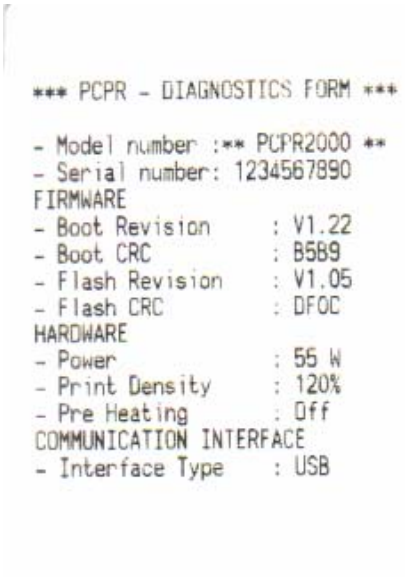
RS232 TICKET



```
*** PCPR - DIAGNOSTICS FORM ***

- Model number :** PCPR2000 **
- Serial number: 1234567890
FIRMWARE
- Boot Revision      : V1.22
- Boot CRC           : B5B9
- Flash Revision     : V1.05
- Flash CRC          : DF0C
HARDWARE
- Power              : 55 W
- Print Density      : 120%
- Pre Heating        : Off
COMMUNICATION INTERFACE
- Interface Type     : RS232
- Baud Rate          : 115200
- Data/Stop Bits     : 8/1
- Parity             : NONE
- Flow Control       : Dtr/Dsr
- Reception error    : Ignore
```

USB TICKET



```
*** PCPR - DIAGNOSTICS FORM ***

- Model number :** PCPR2000 **
- Serial number: 1234567890
FIRMWARE
- Boot Revision      : V1.22
- Boot CRC           : B5B9
- Flash Revision     : V1.05
- Flash CRC          : DF0C
HARDWARE
- Power              : 55 W
- Print Density      : 120%
- Pre Heating        : Off
COMMUNICATION INTERFACE
- Interface Type     : USB
```

6 LIST OF CONTROL CODES

Code (Hexadecimal)	Command	Page
09	Horizontal Tab	28
0A	Print and Feed One Line	25
0D	Activate Carriage Return	25
10 04 n	Real Time Status Transmission	52
10 05 n	Real Time Recovery from Fault	54
11 n1...nx	Print Raster Graphics	34
14 n	Feed n Print Lines	25
15 n	Feed n Dot Rows	25
1B 20 n	Set Right Side Character Spacing	28
1B 21 n	Select Print Mode	32
1B 24 nL nH	Set Absolute Starting Position	29
1B 2D n	Select or Cancel Underline Mode	32
1B 32	Set Line Spacing to 1/6 Inch	26
1B 33 n	Set Line Spacing	26
1B 40	Initialize Printer	24
1B 44 [n]...k NUL	Set Horizontal Position	29
1B 4A n	Print & Feed Paper	26
1B 52 n	Select International Character Set	35
1B 5B 7D	Switch To Flash Download Mode	59
1B 5C nL nH	Set Relative Print Position	32
1B 61 n	Select Justification	30
1B 64 n	Print & Feed n Lines	27
1B 74 n	Set Character Code Table or Active User-defined Front Selection	36
1B 76	Transmit Paper Sensor Status	44
1C 46 t	Read Font Information	36
1C 48	Check Easy Font compatibility	37
1C 4C f8 t w h {d}	Download Single Byte Font	37
1D 01	Request Flash Memory Size	59
1D 06	Get Flash Firmware CRC Status	60
1D 07	Return Boot Sector CRC	60
1D 08	Return Static RAM Size	45
1D 0A	Return Hardware Information	45
1D 0E	Erase All Flash Contents except Boot Sector	60
1D 0F	Return Main Program Flash CRC	61
1D10 *n*	Erase Selected Flash Sector	61
1D11 *al ah cl ch d1…dn*	Download to Active Flash Sector	62
1D 23 n	Select the Current Logo	39
1D 2A n1 n2 [d1...dn]	Define Download Bit Image in Flash Memory	40
1D 2F n	Print Downloaded Bit Image	41
1D 40 n	Erase User Flash Sector	42
1D 42 n	Select or Cancel White/Black Reverse Print Mode	33

Code (Hexadecimal)	Command	Page
1D 48 n	Select Printing Position of HRI Characters	55
1D 49 n	Transmit Printer ID	46
1D 49 40 n	Transmit Printer ID, Remote Diagnostics Extension	47
1D 4C nL nH	Set Left Margin	30
1D 57 nL nH	Set Print Area Width	31
1D 68 n	Select Bar Code Height	55
1D 6B m d1...dk	Print Bar Code	57
1D 6C m	Transmit Selected A/D Channel	48
1D 72 n	Transmit Status (paper sensor status , lash memory user sector status)	48
1D 77 n	Select Bar Code Width	55
1D FF	Reset Firmware	24
1F 01 *d1…dn*	Erase Boot Sector, Download New Code	62
1F 02 n1…n6	Set Communication Interface Parameters	65
1F 03 0B m	Set Preheating Mode	64
1F 03 80 n	Default Code Page Resident Front	66
1F 0B 4E 52 4A n	Set Print Density	64
1F 45 n	Eject Ticket	63
1F 4D nL nH	Reverse Paper Feed	27
1F 56	Send Printer Software Version	49
1F 65 n	Return Logo Checksum	41
1F 74	Print Test Form	43
1F 77 n	Return Memory Allocation Status	50
1F 78 n	Set Rotated Font Download	38
1F 79 n	Load Ticket	63

6.1 Command description

6.1.1 Command conventions

The following information describes how each command is organized:

Command Name
A designation (not the ASCII code) used to identify the command.

Description
A brief summary of the command, followed by detailed information, if necessary.

ASCII	the ASCII control code
Hexadecimal	the Hexadecimal control code
Decimal	the Decimal control code
Value or Values	a description of the command operand values
Range	the upper and lower limits of the command operand
Default	the command operand default after printer reset
Formulas	any formula used for this command.

Exceptions
Describes any exceptions to this command, for example, other commands that the command cannot be used with.

Related Information
This section describes any related information for this command and provides references to other sections for additional information.

6.1.2 Reset Commands

INITIALIZE PRINTER

Synopsis:	Initialize printer.	
ASCII	ESC	@
Hexadecimal	**1B**	**40**
Decimal	27	64

Description: Clears the print line buffer and resets the printer to the default settings for the startup configuration (refer to Default settings below).

Default: Single Wide, Single-High and Left-Aligned characters and reset active logo.

Default bar code settings

Character Pitch	12.7 CPI
Number of Columns Width	32
Extra Dot Rows	3
Character Set	Default
Printing Position	Column One

RESET FIRMWARE

Synopsis:	Reset firmware.	
ASCII	GS	SP
Hexadecimal	**1D**	**FF**
Decimal	29	255

Description: Reboots the printer.

6.1.3 Vertical Positioning and Print Commands

The vertical positioning and print commands control the vertical print positions of characters on the receipt. The commands are described in order of their hexadecimal codes.

PRINT AND FEED ONE LINE

Synopsis: Print and feed one line.
ASCII LF
Hexadecimal **0A**
Decimal 10

Description: Prints one line from the buffer and feeds paper one line.

ACTIVATE CARRIAGE RETURN

Synopsis: Activate carriage return.
ASCII CR
Hexadecimal **0D**
Decimal 13

Description: Prints one line from the buffer and feeds paper one line.
Some applications expect the command to be ignored, while others use it as print command.

FEED N PRINT LINES

Synopsis: Feed n print lines.
ASCII DC4 n
Hexadecimal **14** **n**
Decimal 20 n

Value of *n* The number of lines to feed at current line height setting.
Range of *n* 1-255

Description: Feeds the paper *n* lines at the current line height without printing; ignored if not at start of line.

FEED N DOT ROWS

Synopsis: Feed n dot rows.
ASCII NAK n
Hexadecimal **15** **n**
Decimal 21 n

Value of n: n/203 inch
Range of n: 1-255

Description: Feeds the paper *n* dot rows (*n*/203 inch, *n*/8 mm), without printing.

SET LINE SPACING TO 1/6 INCH

Synopsis: Set line spacing to 1/6 inch.

ASCII	ESC	2
Hexadecimal	**1B**	**32**
Decimal	27	50

Description: Sets the default line spacing to 1/6 of an inch (4, 23 mm).

SET LINE SPACING

Synopsis: Set line spacing.

ASCII	ESC	3	n
Hexadecimal	**1B**	**33**	**n**
Decimal	27	51	n

Value of *n* n/406 inch

Range of *n* 0-255

Default 0.13 inch (3.37 mm)

Description: Sets the line spacing to *n*/406 inch (*n*/16 mm).
The minimum line spacing is 8.5 lines per inch. The line spacing equals the character height when *n* is too small.

Exception: The command is valid only at the beginning of a line.

PRINT AND FEED PAPER

Synopsis: Print and feed paper.

ASCII	ESC	J	n
Hexadecimal	**1B**	**4A**	**n**
Decimal	27	74	n

Value of *n* *n*/203 inch

Range of *n*: 0-255

Description: Prints one line from the buffer and feeds the paper *n*/203 inch (*n*/8 mm).
The line height equals the character height when *n* is too small.
Sets the print starting position to the beginning of the line, after printing is completed.

PRINT AND FEED N LINES

Synopsis:	Print and feed n lines.		
ASCII	ESC	d	n
Hexadecimal	**1B**	**64**	**n**
Decimal	27	100	n

Operand: n = range
Limits : 0-255

Description: Prints one line from the buffer and feeds paper *n* lines at the current line height.

REVERSE PAPER FEED

Synopsis:	Reverse paper feed.			
ASCII	US	M	*nL*	*nH*
Hexadecimal	**1F**	**4D**	**nL**	**nH**
Decimal	31	77	*nL*	*nH*

Operand: n = ((nH * 256) + nL)
= Distance number of dot line (1/8 mm)

Limit : Dec: 0 < n < 32768
Hex: 00 < n < 8000

Description: Execute a reverse paper feed.
Note : Beware when using this sequence, to be sure that the paper will still be inside the printer mechanism.

6.1.4 Horizontal positioning Commands

The horizontal positioning commands control the horizontal print positions of characters on the receipt. The commands are described in order of their hexadecimal codes.

HORIZONTAL TAB

Synopsis: Horizontal tab.

ASCII	HT
Hexadecimal	**09**
Decimal	9

Description: Moves the print position to the next tab position set by the Set Horizontal Tab Positions command.
(1B 44 *n*1 *n*2 ... 00)
The print position is reset to column one after each line.
When no tabs are defined to the right of the current position, or if the next tab is past the right margin, Line Feed is executed.
Print initialization sets 32 tabs at column 9, 17, 25…

SET RIGHT-SIDE CHARACTER SPACING

Synopsis: Set right- side character spacing.

ASCII	ESC	SP	n
Hexadecimal	**1B**	**20**	**n**
Decimal	27	32	n

Range of *n* 0 – 32
Default 0

Description: Sets the right side character spacing to [*n*].
Note: Where n is a multiple of 4.

SET ABSOLUTE STARTING POSITION

Synopsis:	Set absolute starting position.			
ASCII	ESC	$	nL	nH
Hexadecimal	**1B**	**24**	**nL**	**nH**
Decimal	27	36	nL	nH

Value of n: *n* = Number of dots to be moved from the beginning of the line.
nL = Remainder after dividing *n* by 256
nH = Integer after dividing *n* by 256
The values for *nL* and *nH* are two bytes in low byte, high byte word orientation :
((nH * 256) + nL).

Description: Sets the print starting position to the specified number of dots (up to the right margin) from the beginning of the line.
The print starting position is reset to the first column after each line.

Note: Where nL is a multiple of 4.

Formulas: The example shows how to calculate 280 dots as the absolute starting position :
280/256 = 1, remainder of 24 *nL* = 24 *nH* = 1

SET HORIZONTAL TAB POSITIONS

Synopsis:	Set horizontal tab positions.				
ASCII	ESC	D	[n]	…k	NUL
Hexadecimal	**1B**	**44**	**[n]**	**…k**	**0**
Decimal	27	68	[n]	…k	0

Value of n: Column number for tab minus one
(*n* is always less than or equal to the current selected column width)

Value of k: 0-32

Default: Every 8 characters from column. 1 (9, 17, etc.) for normal print

Description: Sets up to 32 horizontal tab-position *n* columns from column one, but does not move the print position. See the Horizontal Tab command (09).
The tab positions remain unchanged if the character widths are changed after the tabs are set. The command ends with hexadecimal 00; hexadecimal 1B 44 00 clears all tabs.

Formulas: Set the tab positions in ascending order and put Hex 00 at the end.
Hex 1B 44 00 (number of tabs not specified) clears all tab positions.

Example: 1B 44 03 04 07 0A 0D 18 00
09 41 09 42 09 43 09 44 09 45 09 46 0A
To obtain: ---A---B--C--D----------EF

SELECT JUSTIFICATION

Synopsis:	Select justification.		
ASCII	ESC	a	n
Hexadecimal	**1B**	**61**	**n**
Decimal	27	97	n

Operand: n = mode selection

Value of *n*
0, 48 = Left aligned
1, 49 = Center aligned
2, 50 = Right aligned

Limits : 0-2, 48-50

Default 0 (Left aligned)

Description: Specifies the alignment of characters, logos, and bar codes (see the value of *n)*.

Exceptions: The command is valid only at the beginning of a line.

SET LEFT MARGIN

Synopsis:	Set left margin.			
ASCII	GS	L	*nL*	*nH*
Hexadecimal	**1D**	**4C**	**nL**	**nH**
Decimal	29	76	*nL*	*nH*

Operand: n = ((**nH** * 256) + **nL**)

Limits:

Range of nL 0-255

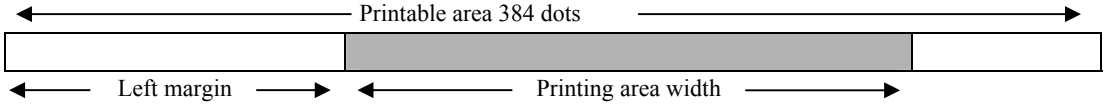
Range of nH 0-1

Default = 384 dots(the maximum printable area)

Description: Sets the left margin of the printing area. The left margin is set to ((*nH* X 256) + *nL*) dots.
The Set Printing Area Width command (1D 57), sets the width of the printing area.
See the Set Printing Area Width command (1D 57) in this document for a description of that command.

Note: If the setting exceeds the printable area, the maximum value of the printable area is used.
The maximum printable area is 384 dots. See the illustration.
The command is ignored if it is not at the beginning of the line.
Where *nL* is a multiple of 4.

Formulas: To set the left margin to one inch, send the four-byte string: GS L 203 0
Or, to set the left margin to two inches, send the four-byte string: GS L 150 1
Where 2 inches = 406/203, and 406 = (1 X 256) + 150.



SET PRINTING AREA WIDTH

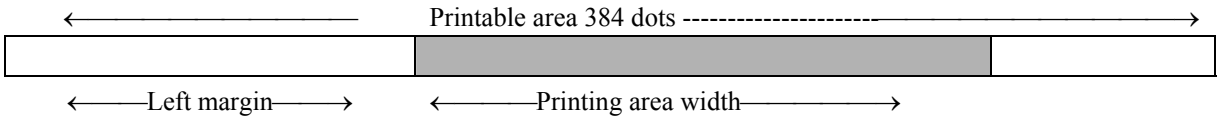
Synopsis:	Set printing area width.			
ASCII	GS	W	*nL*	*nH*
Hexadecimal	**1D**	**57**	**nL**	**nH**
Decimal	29	87	*nL*	*nH*

Operand: **n** = ((nH * 256) + nL) dots
Range of nL 0-255
Range of nH 0-1
Limits : **384 dots (the maximum printable area)**

Description: The width of the printing area is set to n dots.
If the setting exceeds the printable area, the maximum value of the printable area is used.
The width of the printing area follows the Set Left Margin command (1D 4C).
See the Set Left Margin command (GS L) earlier in this document for a description.

Notes: The command is ignored if it is not at the beginning of the line.
If the setting exceeds the printable area, the maximum value of the printable area is used.
Where nL is a multiple of 4.
Minimum print area width = 4.

Formulas: To set the width of the printing area to one inch, send the four-byte string: GS W 203 0
Or, to set the width of the printing area to two inches, send the four-byte string: GS W 150 1
Where 2 inches = 406/203, and 406 = (1 X 256) + 150.



6.1.5 Print Characteristics Commands

These commands control what the printed information looks like, selection of character sets, and setting of margins. The commands are described in order of their hexadecimal codes.

SELECT PRINT MODE

Synopsis: Select print mode.

ASCII	ESC	!	n
Hexadecimal	**1B**	**21**	**n**
Decimal	27	33	n

Value of n:

Bit[1]	Function	0	1
Bit 4	Double High	Canceled	Set
Bit 5	Double Wide	Canceled	Set
Bit 7	Underlined Mode	Canceled	Set (bar thickness = 2)

[1] Bits 0,1,2,3 and 6 are not used "0"

Default: 0 (for bits 4, 5, 7)

Description: Selects the print mode: standard, underlined, double high or double wide.

SELECT OR CANCEL UNDERLINE MODE

Synopsis: Select or cancel underlined mode.

ASCII	ESC	-	n
Hexadecimal	**1B**	**2D**	**n**
Decimal	27	45	n

Value of *n*:

0-48 = Cancel underline mode

1-49 =
2-50 = Select underline mode and bar thickness = 2

Default: 0-48

Description: Turns underline mode on or off. Underlines cannot be printed for spaces set by the Horizontal Tab, Set Absolute Start Position, Set Relative Print Position commands, or in white/black reverse print mode. Underline mode may also be turned ON and OFF with the Select Print Mode(s) command (1B 21).

SET RELATIVE PRINT POSITION

Synopsis: Set relative print position.

ASCII	ESC	\	nL	nH
Hexadecimal	**1B**	**5C**	**nL**	**nH**
Decimal	27	92	nL	nH

Value of *n*:

To Move the Relative Starting Position Right of the Current Position:

n = Number of dots to be moved right of the current position

nL = Remainder after dividing *n* by 256

nH = Integer after dividing *n* by 256

The values for *nL* and *nH* are two bytes in low byte, high byte word orientation.

To Move the Relative Starting-Position Left of the Current Position:

n = Number of dots to be moved left of the current position

nL = Remainder after dividing (65536-*n*) by 256

nH = Integer after dividing (65536-*n*) by 256

The values for *nL* and *nH* are two bytes in low byte, high byte word orientation.

Description: Moves the print-starting position the specified number of dots either right (up to the right margin) or left (up to the left margin) of the current position.

The print starting position is reset to the first column after each line.

Any setting that exceeds the printable area is ignored.

Note: Where *nL* is a multiple of 4.

Formulas: To move to the left:

The example shows how to set the relative position 20 dots to the left of the current position.

65536-20 = 65516 65516/256 = 255, remainder of 236 *nL* = 236, *nH* = 255

To move to the right:

The example shows how to set the relative position 260 dots to the right of the current position.

260/256 = 1, remainder of 4 *nL* = 04, *nH* = 01

SELECT OR CANCEL WHITE/BLACK REVERSE PRINT MODE

Synopsis: Select or cancel white/black reverse print mode.

ASCII	GS	B	*n*
Hexadecimal	**1D**	**42**	**n**
Decimal	29	66	*n*

Operand: n = mode selection:

Value of *n*

0 = Off

1 = On

Default 0 (Off)

Description: In White/Black reverse printing mode, print dots and non-print dots are reversed, which means that white characters are printed on a black background.

When the White/Black reverse printing mode is selected it is also applied to character spacing which is set by Right-Side Character Spacing (ESC SP).

This command can be used with built-in characters and user-defined characters, but does not affect the space between lines.

White/Black Reverse Print Mode does not affect graphics, logos, bar code, HRI characters, and spacing skipped by Horizontal Tab (HT), Set Absolute Starting Position (ESC $), and Set Relative Print Position (ESC \).

Exceptions: Only the lowest bit of *n* is valid.

6.1.6 Graphics Commands

This command is used to enter and print graphics data.

PRINT RASTER GRAPHICS

Synopsis:	Print raster graphics.
ASCII	DC1 n1…n48
Hexadecimal	**11 n1…n48**
Decimal	17 n1…n48
Value of n:	n1…n48 = 48 Data bytes
Range:	0 – 255
Description:	Prints one row of data. *n*1 ... *n48*: bytes describing the line to print.

6.1.7 Font Commands

- Selected Commands

SELECT INTERNATIONAL CHARACTER SET

Synopsis: Select international character set.

ASCII	ESC	R	n
Hexadecimal	**1B**	**52**	**n**
Decimal	27	82	n

Operand: n = mode selection

Limits : 0 - 10

Default: 0

n	Country
0	USA
1	France
2	Germany
3	UK
4	Denmark I
5	Sweden
6	Italy
7	Spain
8	Japan
9	Norway
10	Denmark II

Description: Selects the character set mapping to be used or selected the flash user single bytes fonts. See Table below.

Additional codes

	n	35_D 23_H	36_D 24_H	64_D 40_H	91_D $5B_H$	92_D $5C_H$	93_D $5D_H$	94_D $5E_H$	96_D 60_H	123_D $7B_H$	124_D $7C_H$	125_D $7D_H$	126_D $7E_H$
U.S.A.	0	#	$	@	[	\	]	^	`	{	¦	}	~
France	1	#	$	à	°	ç	§	^	`	é	ù	è	"
Germany	2	#	$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
U.K.	3	£	$	@	[	\	]	^	`	{	¦	}	~
Denmark I	4	#	$	@	Æ	Ø	Å	^	`	æ	ø	å	~
Sweden	5	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
Italy	6	#	$	@	°	\	é	^	ù	à	ò	è	i
Spain	7	Pt	$	@	i	Ñ	¿	^	`	"	ñ	}	~
Japan	8	#	$	@	[	¥	]	^	`	{		}	~
Norway	9	#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
Denmark II	10	#	$	E	Æ	Ø	Å	Ü	é	æ	ø	å	ü

SELECT CHARACTER CODE TABLE OR ACTIVE USER-DEFINED FONT SELECTION

Synopsis: Select character code table or active user-defined font selection

ASCII	ESC	t	n
Hexadecimal	**1B**	**74**	**n**
Decimal	27	116	n

Operand: n = mode selection

Limits :

n		Code Page
Decimal	**Hex**	
0	00	437 : US
6	06	858 : Multilingual with Euro
48	30	Font Storage n°00
49	31	Font Storage n°01
50	32	Font Storage n°02
51	33	Font Storage n°03

Default: 6 (Code Page 858), selectable through configuration menu

Description: Selects the character set to be used.

- Downloaded Commands

READ FONT INFORMATION

Synopsis: Read font information.

ASCII	FS	F	t
Hexadecimal	**1C**	**46**	**t**
Decimal	28	70	t

Operand: t = Font storage Identify

Value of t:	48	0x30 (ASCII *n* = 0)	Single Font n°00
	49	0x31 (ASCII *n* = 1)	Single Font n°01
	50	0x32 (ASCII *n* = 2)	Single Font n°02
	51	0x33 (ASCII *n* = 3)	Single Font n°03

Returns:	OK	ACK (Hex = 06)	1 byte
		Font Id	1 byte
		Font Name	8 bytes
		Font width	1 byte
		Font Height	1 byte
		Number of characters	2 bytes < LSB , MSB>
		Checksum (Hex)	2 bytes < LSB , MSB>
	Fault	NAK (Hex = 15)	1 Byte

Description: If selected font exists, this command returns ACK followed by font information.
Else it returns NAK.

CHECK EASY FONT COMPATIBILITY

Synopsis:	Check Easy Font compatibility.	
ASCII	FS	H
Hexadecimal	**1C**	**48**
Decimal	28	72

Returns ASCII:	OK	ACK + list of available font Ids + 00
	Fault	NAK
Returns Hex:	OK	06 + list of available font Ids + 00
	Fault	15

Description: This command asks the printer whether it supports or not Font download.

If it does, it also returns the list of available font Ids (single byte, double byte) that can be used to download a font.

DOWNLOAD SINGLE BYTE FONT

Synopsis:	Download single byte printer font in User flash memory.						
ASCII	FS	L	f8	t	*w*	*h*	{d}
Hexadecimal	**1C**	**4C**	**f8**	**t**	**w**	**h**	**{d}**
Decimal	28	76	*f8*	*t*	*w*	*h*	*{d}*

Operands:	f8	8 characters font name.
	t	Font storage Id.
	w	Font character width in dots, including inter-character space.
	h	Font character height in dots, not including inter-line space.
	d	Downloaded data bytes.
Limit Hex:		0x20 ≤ f8 ≤ 0x7F
		0x30 ≤ t ≤ 0x33
		0x01 ≤ w, h ≤ 0x20
		0x00 ≤ d ≤ 0xFF

Description: This command will download a single byte font code page to the printer.

If the download is successful, an ACK will be returned.

If unsuccessful, a NAK will be returned. A font must always be downloaded completely, which corresponds to 224 characters.

The font name is used to identify the font. It will be printed on the diagnostics or configuration form. When a downloaded font is to be deleted, the font name is used to identify the font. Two fonts cannot have the same name. Each character is downloaded as raster, from top to bottom, and for each raster, from leftmost byte to rightmost byte. Two fonts cannot have the same storage Id.

Notes: See command select … (1Bh 74h n).

See also § User Flash memory commands for management.

SET ROTATED FONT DOWNLOAD

Synopsis:	Select the Rotated Font Mode		
ASCII	US	x	*n*
Hexadecimal	**1F**	**78**	**n**
Decimal	31	120	*n*

Operand:	n	= mode Selection
Value Decimal	0	Normal
	1	Rotated CW
Default:	0	

Limit:	Dec:	$0 \leq n \leq 1$
	Hex:	$00 \leq n \leq 01$

Description: Selects the orientation of the fonts that will be downloaded. It does not actually perform any rotation, the font needs to be designed already rotated before download with command 1C 4C

Note: This parameter is lost upon printer reset

6.1.8 Logo Commands

- Downloaded Commands

SELECT THE CURRENT LOGO

Synopsis:	Select the current Logo.		
ASCII	GS	#	*n*
Hexadecimal	**1D**	**23**	**n**
Decimal	29	35	*n*

Operand: n = mode selection

Range of n: 0 – 63

Description: Selects a logo to be defined or printed. The active logo *n* remains in use until this command is sent again with a different logo *n*, or command 1B40 is sent or printer reboots.

When this command precedes a logo definition, that definition is stored in flash memory as logo *n*.

If there is already a different definition in flash memory for logo *n*, the first is inactivated and the new definition is used. The inactive definition is not erased from flash and continues to take up space in flash memory.

When this command precedes a logo print command and *n* is different from the previously active logo selected, the printer retrieves the logo definition for *n* from memory and prints it. If there is no definition for logo *n*, then no logo is printed.

Note: An application using multiple logos, into flash memory, is responsible for erasing the flash memory page when the logo area is full.

Synopsis: Define downloaded bit image in flash memory.

ASCII	GS	*	*n1*	*n2*	*d1…dn*
Hexadecimal	**1D**	**2A**	**n1**	**n2**	**d1…dn**
Decimal	29	42	*n1*	*n2*	*d1…dn*

Operands:

Value of *n*1	**Value of *n*2**	**Value of *d***
1-48 (8 x *n*1 = Number of Horizontal Dot Columns)	1-255 (Number of Vertical Bytes)[1]	Bytes of Data (Printed Down, Then Across)

[1]The number of bytes sent is represented by the following formula:

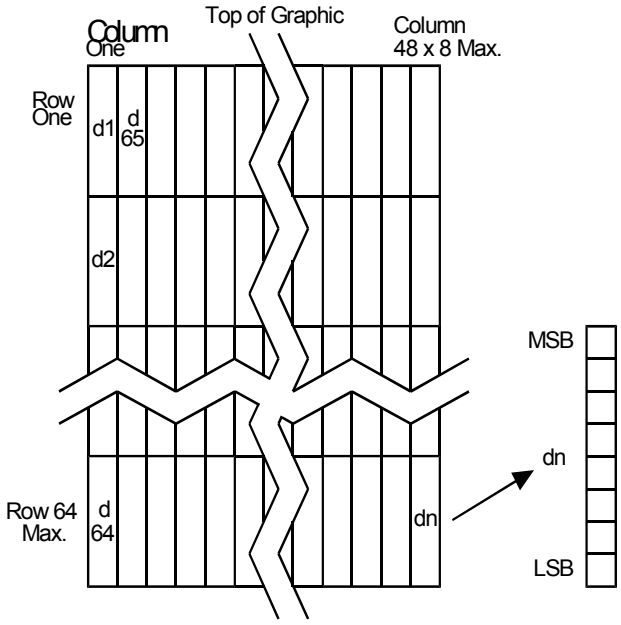
n = 8 x *n*1 x *n*2 (*n*1 x *n*2 must be less than or equal to 49138 < Size User Flash memory).

See the illustration below for a graphic representation of the downloaded bit image :

Description: Enters a downloaded bit image (such as a logo) into Flash with the number of dots specified by *n*1 and *n*2.

The downloaded bit image is available until another bit image is defined, or either Initialize Printer (1B 40 or 1D 40 n), command is received.

Note: See the illustration for the Print Downloaded Bit Image command (1D 2F) for a representation of the bit image.



- Printed Logo Commands

PRINT DOWNLOADED BIT IMAGE

Synopsis: Print downloaded bit image.

ASCII	GS	/	*m*
Hexadecimal	**1D**	**2F**	**m**
Decimal	29	47	*m*

Operand: m = mode selection:

Value of *m*	Print Mode	Vertical DPI[1]	Horizontal DPI*
0	Normal	203	203
1	Double Wide	203	101
2	Double High	101	203
3	Quadruple	101	101

[1]Dot density measured in dots per inch

Description: Prints the downloaded bit image at a density specified by *m*. It is ignored if any data is in the print buffer, if the downloaded bit image is undefined.

Note: See the illustration on the previous page for a representation of the bit image (1D 2A).

RETURN LOGO CHECKSUM

Synopsis: Return the checksum of a logo.

ASCII	US	V	*n*
Hexadecimal	**1F**	**65**	**n**
Decimal	31	101	*n*

Operand: n = Selected logo

Limit : Dec: 0 < n < 63
Hex: 0 < n < 3F

Return Format : 4 Bytes :

Byte 1	= 65 (Hex) = Command ID	
Byte 2	= 01 (Hex) = Logo present	= 00 (Hex) = Logo absent
Byte 3	= Checksum (LSB)	= 00 (Hex)
Byte 4	= Checksum (MSB)	= 00 (Hex)

Description: Returns the checksum of a logo downloaded in flash memory (see command 1D 2A…)
Reply 4 bytes [Command ID + Flag + checksum of the logo] specified by n.
Checksum is two's complement of sum of **all** bytes in the download sequence.

Note : If n is out of range, no reply command.

Example: Checksum = **-** (0x1D + 0x2A + …) For the "Define Downloaded Bit Image" command.

See also § User Flash memory commands for management.

6.1.9 User Flash Memory Commands

ERASE USER FLASH SECTOR

Synopsis:	Erase user flash sector.		
ASCII	GS	@	*n*
Hexadecimal	**1D**	**40**	**n**
Decimal	29	64	*n*

Operand:	n	= mode selection:	
Value of *n*:	49	*n* = 49 (ASCII *n* = 1)	Erase User flash Memory
	51	*n* = 51 (ASCII *n* = 3)	Erase User flash (Easy Font)

Description: Erases a section of user flash memory and sends a carriage return when the operation is complete.

This command erases all 48K Flash memory sectors allocated to logos storage and fonts storage.

Those sectors should be erased: when the logo definition area is full and an application is attempting to define new logos. All logo definitions are erased and must be redefined.

Important: While erasing flash memory, all communication is disabled.

To provide feedback to the application, the printer responds to the application when the erase is complete by sending (0D). After sending the Erase User Flash Sector (1D 40 n) command, an application should wait for the response from the printer before sending data. Otherwise, data will be lost.

If an application is unable to receive data, it should wait a minimum of five seconds after sending the Erase User Flash Sector (1D 40 *n*) command before sending data.

6.1.10 Printer Configuration Commands

PRINT TEST FORM

Synopsis:	Print test form.	
ASCII	US	t
Hexadecimal	**1F**	**74**
Decimal	31	116

Description: Prints the current configuration settings on the receipt.

Note : During the self test , the printer is offline

6.1.11 Printer Status Commands

These commands enable the printer to communicate with the host computer. They are stored in the printer's data buffer as they are received, and are handled by the firmware in the order in which they were received.

When a fault occurs, the printer will go busy at the communication interface and not respond to either of the Printer Status commands. If the fault causing the busy condition can be cleared, such as by loading paper, or letting the thermal print head cool down, the printer will resume processing the data in its receive buffer.

Real Time commands allow the printer to respond immediately, even though it is busy at the communication interface. See the following section, Real Time Commands, for details about these commands.

TRANSMIT PAPER SENSOR STATUS

Synopsis:	Sends status data to the host computer.	
ASCII	ESC	v
Hexadecimal	**1B**	**76**
Decimal	27	118

Returns Values: Status Byte

Bit	Function	0 Signifies	1 Signifies
0	Reserved	-	-
1	Receipt Cover	Closed	Open
2	Receipt Paper	Present	Out
3	Reserved	-	-
4	Not Used	Fixed to Zero	Fixed to Zero
5	Temperature	In valid range	Too hot or too cold
6	Voltage	In valid range	Too high or too low
7	Not Used	Fixed to Zero	Fixed to Zero

Description: The printer sends one byte to the host computer when it is not busy or in a fault condition.

Related Information: See Busy Line and Fault Conditions in the Real Time Commands section of this document for details about fault condition reporting.

RETURN STATIC RAM SIZE

Synopsis: Return static ram size.

ASCII	GS	BS
Hexadecimal	**1D**	**08**
Decimal	29	8

Return: 1 byte = SRAM sizes

Values (Dec):

6 kb (internal RAM only)	= 0
128 kb (w/extension)	= 2

Description: Returns the size of SRAM on board, on one byte as number of 64 Kbytes sectors.

RETURN HARDWARE INFORMATION

Synopsis: Return hardware information.

ASCII	GS	LF
Hexadecimal	**1D**	**0A**
Decimal	29	10

Returns: 1 bytes = Status Byte reply

Value:

Bit	Function	0 Signifies	1 Signifies
0	Last NVRAM program	OK	Failure
1	Head connector (s)	OK	Failure
2	Flash extern program	OK	Failure
3	Printer Head voltage	24V	12V
4	Pre Heating	Off	On
5	Not Used	Fixed to Zero	Fixed to Zero
6	Purge data USB	No	Yes
7	Power fail	No	Yes

Description: Sends status data to the host computer.
The printer sends one byte to the host computer when it is not busy or in a fault condition.

Note: Last NVRAM program bit 0: Reset each write NVRAM command.
Power fail bit 7: after first read go to zero.
Purge data USB bit 6: after read go to zero.

Synopsis: Transmit printer Identify

ASCII	GS	I	*n*
Hexadecimal	**1D**	**49**	**n**
Decimal	29	73	*n*

Operand: **n** **= Printer ID select**

Limit decimal: $1 \le n \le 2$; $49 \le n \le 50$; $n = 66,67,68$

Limit hex: $01 \le n \le 02$; $31 \le n \le 32$; $n = 42,43,44$

Description: Transmits the printer model, type of version as defined below.
This command is processed as normal printer data.

Note: For n = 66, 67, 68 the printer response is sent back in the following format:
Header: 5F (hex)
Data: ASCII string
NULL: 00 (hex)

"GS I" OPERAND AND RETURNED STATUS DEFINITION

n					Value	
Decimal	**Hex**	**Printer ID**	**Function**		**Decimal**	**Hex**
1, 49	01, 31	Model	PCPR		55	37
2, 50	02, 32	Type	Bit	Function	Value	
					0	1
			0	2-byte character code	Not installed	Installed
			1	Undefined		
			2	Undefined		
			3	Undefined		
			4	Fixed	Always 0	-
			5	Undefined		
			6	Undefined		
			7	Fixed	Always 0	-
66	42	Manufacturer	_AXIOHM			
67	43	Printer name	_PCPR			
68	44	Serial number	Depends on actual S/N			

Synopsis: Performs the remote diagnostic functions specified by *n*.

ASCII	GS	I	@	*n*
Hexadecimal	**1D**	**49**	**40**	**n**
Decimal	29	73	*64*	*n*

Operand: **n** mode selection
Values of n: Refer to table below
Return format:: n + data +<CR>

Description: Performs functions specified by *n (Refer to table).*
Exceptions: If any digit is out of the defined range, Write to NVRAM is ignored.

Value of *n*		**Remote diagnostic item**		**Function**
Hex	**Dec**			
20	32	Serial #, 10 digit ASCII	*	Write to NVRAM Example, send 14 bytes to printer: GS I @ 0x20 1234567890
23	35	Serial #		Return Serial #, preceded by *n* to identify Printer returns 12 bytes in above example: #1234567890<CR>
24	36	Class/model #, 15 digit ASCII	*	Write to NVRAM
27	39	Class/model #		Return Class/model #, returns 17 bytes
2F	47	Boot firmware CRC, 4 digit ASCII		Return Boot firmware CRC, returns 6 bytes
37	55	Flash firmware CRC, 4 digit ASCII		Return Flash firmware CRC, returns 6 bytes
97	151	Boot firmware version		Return Boot firmware version, returns 6 bytes
A3	163	Flash firmware version		Return Flash firmware version, returns 6 bytes

* 0x20 ≤ digit ≤ 0x79

TRANSMIT SELECTED A/D CHANNEL

Synopsis:	Transmit selected A/D channel (Voltage, Temperature).		
ASCII	GS	l	*m*
Hexadecimal	**1D**	**6C**	**m**
Decimal	29	108	*m*

Operand:	m	= Selected channel :
Value of *m*	8	= Voltage Value
	9	= Temperature Value
Returns:	1	Byte , see below

Description: Returns the value off the voltage or temperature.

Note: Tolerance not taken into consideration, calculation not precise.

- ***m* = 0x08 :**

Sends an octet of between 0 and 255 = Value measured on the A-D converter = AD measure

Formulas: Voltage (V) = 0.11274 x AD measure

Example: AD measure = *213* ➔ Voltage = *24.01V*

AD measure = *186* ➔ Voltage = *21.00V*

- ***m* = 0x09 :**

Sends an octet of between 0 and 255 = value measured on the temperature converter = AD measure

Formulas: RTH (Kohm) = 100 / ((255 / AD measure) - 1)

Temp (°C) = (3950 / (ln (RTH / 30) + 13.255)) - 273

Example: AD measure = 60 ➔ RTH= 30.769ko ➔ Temp = 24.43°C

AD measure = 27 ➔ RTH=11.842ko ➔ Temp = 47.47°C

TRANSMIT STATUS (PAPER SENSOR STATUS, FLASH MEMORY USER SECTOR STATUS).

Synopsis:	Transmit status (Paper sensor Status, Drawer Kick out Status, Flash memory User Sector status).		
ASCII	GS	l	*n*
Hexadecimal	**1D**	**72**	**n**
Decimal	29	114	*n*

Operand:	n	= Mode selection
Value of n	1, 49	= Paper sensor Status
	4, 52	= Flash memory User Sector status
Returns:	1	Byte. The status bytes to be transmitted are described in the following tables:

Description: Transmits the status specified by *n*.

This is a batch mode command which transmits the response after all prior data in the receive buffer has been processed.

There may be a time lag between the printer receiving this command and transmitting the response, depending on the receive buffer status.

Note: When *n* is out of the specified range, the command is ignored.

Paper sensor Status (*n* = 1 or *n* = 49)

Bit	Off/On	Hex	Decimal	Status for Transmit Status
0	-	-	-	Undefined
	-	-	-	Undefined
1	-	-	-	Undefined
	-	-	-	Undefined
2	Off	00	0	Paper End : Paper Present
	On	04	4	Paper End : Paper absent
3	-	-	-	Undefined
4	Off	00	0	Not used. Fixed to off.
5	-	-	-	Undefined
6	-	-	-	Undefined
7	Off	00	0	Not used. Fixed to off.

Flash memory User Sector Status (*n* = 4 or *n* = 52)

Bit	Off/On	Hex	Decimal	Status for Transmit Status
0	-	-	-	Undefined.
1	-	-	-	Undefined.
2	Off	00	0	Not Used. Fixed to off
3	Off	00	0	Logo(s) defined.
	On	08	8	No logo defined.
4	Off	00	0	Not used. Fixed to off.
5	Off	00	0	No user-defined characters written to flash.
	On	20	32	User-defined characters written to flash
6	Off	00	0	Not used. Fixed to off.
7	-	-	-	Undefined.

SEND PRINTER SOFTWARE VERSION

Synopsis: Send printer software version.

ASCII	US	V
Hexadecimal	**1F**	**56**
Decimal	31	86

Return : 8 bytes ASCII

Description: The printer returns 8 bytes containing the boot and flash software version.
The first 4 bytes returned are an ASCII string for the boot version.
The second 4 bytes are an ASCII string for the flash version.

Example: The printer returns 1.220.26
This means the boot version is 1.22 and the flash version is 0.26

RETURN MEMORY ALLOCATION STATUS

Synopsis:	Reply flash memory allocation in user section.		
ASCII	US	v	*n*
Hexadecimal	**1F**	**77**	**n**
Decimal	31	119	*n*

Operand:

n	= Status select
1	Reply the amount of Flash memory available in user section.
2	Reply the amount of Flash memory available in User Download font section (Easy Font).

Limit	Dec:	n =1	n =2
	Hex:	n= 01	n= 02

Description: Returns the amount of Flash memory available in user sections.

Note: Only one user section 48K bytes, n=1= n=2.

Returns the number of bytes available as a zero terminated ASCII string.

Each digit is coded in decimal.

6.1.12 Real Time Commands

6.1.12.1 Rules for Real Time Commands

Applications should not let the buffer fill up with Real Time commands when the printer is busy at the communication interface. A busy condition can be determined by bit 3 of the response to DLE EOT 1. Other responses to DLE EOT n can determine the reason for a particular busy condition.

Although the printer responds to Real Time commands when it is busy, it will place them into the buffer behind any other data there, and flush them out in the order in which they were received. When the printer is busy due simply to buffer full (that is, it can't print data as fast as it can receive it), then data continues to be processed out of the buffer at approximately print speed and the Real Time commands will eventually get flushed out.

When the printer is busy due to an error condition, then data stops being processed of the buffer until the condition clears one way or another. In either case, but more quickly in the case of an error condition, the buffer can fill with Real Time commands.

To guard against this situation, the application must determine the cause of a busy condition and take appropriate action or pace the Real Time commands to avoid filling the buffer. There is a minimum of 256 bytes available in the printer's buffer when it goes busy.

6.1.12.2 Moving Data Through the Buffer

Applications should not let the buffer fill up with Real Time commands when the printer is busy at the communication interface. A busy condition can be determined by bit 3 of the response to DLE EOT 1. Other responses to DLE EOT n can determine the reason for a particular busy condition.

Although the printer responds to Real Time commands when it is busy, it will place them into the buffer behind any other data there, and flush them out in the order in which they were received. When the printer is busy due simply to buffer full (that is, it can't print data as fast as it can receive it), then data continues to be processed out of the buffer at approximately print speed and the Real Time commands will eventually get flushed out.

When the printer is busy due to an error condition, then data stops being processed of the buffer until the condition clears one way or another. In either case, but more quickly in the case of an error condition, the buffer can fill with Real Time commands.

To guard against this situation, the application must determine the cause of a busy condition and take appropriate action or pace the Real Time commands to avoid filling the buffer. There is a minimum of 256 bytes available in the printer's buffer when it goes busy.

6.1.12.3 Busy Line Fault Conditions

If the printer is in error condition (cover is open, paper is exhausted…), the printer will go busy immediately. Then it will stay busy and stop processing data out of the receive buffer until the condition clears. It will respond to the Real Time commands as described below.

REAL TIME STATUS TRANSMISSION

Transmits the selected one byte printer status specified by *n* in Real Time according to the following parameters.

	DLE Sequence
ASCII	DLE EOT *n*
Hexadecimal	**10 04 *n***
Decimal	16 4 *n*

Value of *n*	DLE Sequence
	1 = Transmit printer status
	2 = Transmit extended printer status
	3 = Transmit error status

Exceptions
The command is ignored if *n* is out of range.

Related Information

1 = Transmit Printer Status

Bit	Status	Hex	Decimal	Function
0	Off	00	0	Fixed to Off.
1	On	02	2	Fixed to Off.
2				Undefined
3	Off On	00 08	0 8	Not busy at the communication interface. Printer is Busy at the communication interface
4	On	10	16	Fixed to On.
5	Off	00	0	Fixed to Off.
6	Off	00	0	Fixed to Off.
7	Off	00	0	Fixed to Off.

2 = Transmit extended printer status

Bit	Status	Hex	Decimal	Function
0	Off	00	0	No ticket.
	On	01	1	Simple size ticket inserted, ready for print
1	Off	00	0	No ticket.
	On	02	2	Double size ticket inserted, ready for print
2	Off	00	0	Transaction in progress
	On	04	4	Ready for new transaction
3	Off	00	0	No ticket detected by entry sensor.
	On	08	8	Ticket detected by entry sensor
4	Off	00	0	Last Paper loading (1F 79 n) was successful
	On	10	16	Last Paper loading (1F 79 n) failed
5	Off	00	0	No ticket detected by ticket inserted sensor.
	On	20	32	No ticket detected by ticket inserted sensor.
6	Off	00	0	Communication Receive Buffer empty
	On	40	64	Communication Receive Buffer is not empty
7	Off	00	0	No paper JAM
	On	80	128	Paper JAM (ticket in printer)

3 = Transmit Error Status

Bit	Status	Hex	Decimal	Function
0	Off	00	0	Fixed to Off.
1	On	02	2	Fixed to On.
2	Off	00	0	Fixed to Off.
3	Off	00	0	Fixed to Off.
4	On	10	16	Fixed to On.
5	Off	00	0	No unrecoverable error.
	On	20	32	Unrecoverable error occurred.
6	Off	00	0	Thermal print head temp. and power supply voltage are in range.
	On	40	64	Thermal print head temp. or power supply voltage are out of range.
7	Off	00	0	Fixed to Off

REAL TIME RECOVERY FROM FAULT

Synopsis:	Real time recovery from fault.		
ASCII	DLE	ENQ	n
Hexadecimal	**10**	**05**	**n**
Decimal	16	5	n

Operand: n = Recovery mode

Limit
Dec: n = 2
Hex: n = 02

Description: When the printer is an error status, this command clearing the data in the receive buffer and print buffer.

Notes: This command will attempt recovery from any fault that prevents printing including jams and paper out.

Recovering from a print head over temperature condition is only accomplished by waiting until the print head has returned to its operating temperature range.

This command will be ignored until manual intervention has occurred to clear the fault condition. The indication of manual intervention for clearing paper out, paper jams.

6.1.13 Bar Code Commands

These commands format and print bar codes, and are described in order of their hexadecimal codes.

SELECT PRINTING POSITION OF HRI CHARACTERS

Synopsis: Select printing position for HRI characters.

ASCII	GS	H	*n*
Hexadecimal	**1D**	**48**	**n**
Decimal	29	72	*n*

Operand:

n	**= Printing position**
0	= Not printed
1	= Above the bar code
2	= Below the bar code
3	= Both above and below the bar code

Default: 0

Description: Prints HRI (Human Readable Interface) characters above or below the bar code.

SELECT BAR CODE HEIGHT

Synopsis: Select bar code height.

ASCII	GS	h	*n*
Hexadecimal	**1D**	**68**	**n**
Decimal	29	104	*n*

Operand: n = Number of dots

Limits: 1≤ n ≤ 255

Default = 216 dots

Description: Sets the bar code height to *n* dots or *n*/203 inch (*n*/8 mm).

PRINT BAR CODE

Synopsis: Selects the bar code type and prints a bar code for the ASCII characters entered.

	First Variation					Second Variation				
ASCII	GS	k	*m*	*d1…dk*	*NUL*	GS	k	*m*	*n*	*d1…dk*
Hexadecimal	**1D**	**6B**	**m**	**d1…dk**	**00**	**1D**	**6B**	**m**	**n**	**d1…dk**
Decimal	29	107	*m*	*d1…dk*	*0*	29	107	*m*	*n*	*d1…dk*

(0 = End of command)

Operands: See tables below.

Description: There are two variations to this command.

The first variation uses a NULL character to terminate the string; the second uses a length byte at the beginning of the string to compensate for the Code 128 bar code that can accept a NULL character as part of the data.

With the second variation the length of byte is specified at the beginning of the string.

Bar codes can be aligned left, center, or right using the Align Positions command (1B 61).

The check digit is calculated for UPC and JAN (EAN) codes if it is not sent from the host computer.

Six-character zero-suppressed UPC-E tags are generated from full 11 or 12 characters sent from the host computer according to standard UPC-E rules.

Start/Stop characters are added for Code 39 if they are not included.

Exceptions: The command is only valid at the beginning of a line.

Illegal data cancels the command.

If the width of the bar code exceeds one line, the bar code is not printed.

First Variation: Data string terminated with NULL Character

Description: The value of *m* selects the bar code system as described in the table.

The variable *d* indicates the character code to be encoded into the specified bar code system. See the table.

Exceptions: If character code *d* cannot be encoded, the printer prints the bar code data processed so far, and the following data is treated as normal data.

m	Bar Code	d	n, Length
0	UPC-A	48- 57 (ASCII numerals)	Fixed Length: 11, 12
1	UPC-E	48- 57	Fixed Length: 11, 12
2	JAN13 (EAN)	48- 57	Fixed Length: 12, 13
3	JAN8 (EAN)	48- 57	Fixed Length: 7,8
4	Code 39	48- 57, 65- 90 (ASCII alphabet), 32, 36, 37, 43, 45, 46, 47 (ASCII special characters) d1 = dk = 42 (start/stop code is supplied by printer if necessary)	Variable Length
5	Interleaved 2 of 5	48- 57	Variable Length (Even Number)

Second Variation: Length of Byte Specified at Beginning of String

Description: The value of *m* selects the bar code system as described in the table.

The variable *d* indicates the character code to be encoded into the specified bar code system. See the table.

Exceptions: If character code *d* cannot be encoded, the printer prints the bar code data processed so far, and the following data is treated as normal data.

m	Bar Code	d	n, Length
65	UPC-A	48- 57 (ASCII numerals)	Fixed Length: 11, 12
66	UPC-E	48- 57	Fixed Length: 11, 12
67	JAN13 (EAN)	48- 57	Fixed Length: 12, 13
68	JAN8 (EAN)	48- 57	Fixed Length: 7, 8
69	CODE39	48- 57, 65- 90 (ASCII alphabet), 32, 36, 37, 43, 45, 46, 47 (ASCII special characters) *d1* = *dk* = 42 (start/stop code is supplied by printer if necessary)	Variable
70	Interleaved 2 of 5 (ITF)	48- 57	Variable (Even Number)
73	Code 128	0-105 *d1* = 103-105 (must be a Start code) *d2* = 0-102 (data bytes) (Stop code is provided by the printer)	Variable

SELECT BAR CODE WIDTH

Synopsis: Select bar code width.

ASCII	GS	w	*n*
Hexadecimal	**1D**	**77**	**n**
Decimal	29	119	*n*

Operand: n

Range 1 ,2, 3, 4, 5,6

Default 3

Formulas *n*/203 inch (*n*/8 mm).

Description: Sets the bar code module to *n*/203 inch (*n*/8 mm).

6.1.14 Flash Firmware Download Commands

These commands are used to load firmware into the printer.

There are three ways to enter the download mode:

1. Powering the printer up with: pin J2.5 and pin J2.6 connected.
2. While the printer is running normally, send the command, “Switch to Flash Download Mode (1B 5B 7D)” to leave normal operation and enter the download mode.
3. If the Flash if found corrupted during Level 0 diagnostics the download mode is automatically entered after the printer has reset.

The printer never goes directly from the download mode to normal printer operation. To return to normal printer operation either the operator must turn the power off and then on to reboot or the application must send a command to cancel download mode and reboot.

When each flash download command is received, the printer returns either ACK or NAK to the host computer when each command is received:

ACK (hexadecimal 06) Sent when the printer has received a host transmission and has completed the request successfully.
NAK (hexadecimal 15) Sent when a request is unsuccessful.

The commands are listed in numerical order according to their hexadecimal codes.
Each command is described and the hexadecimal, decimal, and ASCII codes are listed.
Communicates to the printer information downloaded from applications.
Data is downloaded to flash memory to query the state of the firmware, calculate the firmware CRC and other functions.

6.1.14.1 Firmware Download Sequence

By providing a set of low-level commands, great freedom of implementation is given to customer application to customize the sequence to match its specific requirements.

Following is the description of a typical Firmware download sequence.
Only the main steps are mentioned.
Error checking and error recovery is not described:

1) Switch to Flash Download Mode

2) Check Flash Memory Size

3) Erase all Flash Memory sectors, except Boot Sector

4) Download Code to Active Flash Sector
   4.1) Select Flash memory sector #n (each sector contains 64kbytes)
      4.1.1) Program segment of N bytes
      4.1.2) if more segments, loop back to 4.1.1)
   4.2) if more sectors to program, loop back to 4.1)

5) Check Flash CRC

6) Reboot Printer

6.1.14.2 Commands

SWITCH TO FLASH DOWNLOAD MODE

Synopsis: Switch to flash download mode.

ASCII	ESC	[	}
Hexadecimal	**1B**	**5B**	**7D**
Decimal	27	91	125

Description:

Puts the printer in flash download mode in preparation to receive commands controlling the downloading of objects into flash memory.

When this command is received, the printer leaves normal operation and can no longer print transactions until the Reboot the Printer command (1D FF) is received or the printer is rebooted.

This command does not affect the current communication parameters. Once the printer is in flash download mode, this command is no longer available.

Note:

This command does not affect the current communication parameters.

Once the printer is in flash download mode, this command is no longer available.

REQUEST FLASH MEMORY SIZE

Synopsis: Request flash memory Size.

ASCII	GS	SOH
Hexadecimal	**1D**	**01**
Decimal	29	1

Return : 1 bytes

Description:

Returns the size of the flash used.

There may be 2 sectors (64K each) in flash memory.

This command assures that the firmware to be downloaded is the appropriate size for flash memory.

The returned value corresponds to the highest sector number that can be accepted by the Select Sector to Download (1D 02 *nn*) command : 1 = 128 Kbytes Flash

GET FLASH FIRMWARE CRC STATUS

Synopsis:	Get flash firmware Sector CRC.	
ASCII	GS	ACK
Hexadecimal	**1D**	**06**
Decimal	29	6

Description: Causes the printer to calculate the CRC for the Flash firmware code space and transmits the result.

This is performed normally after downloading completely a new firmware to verify that the downloaded firmware is valid.

The printer transmits ACK if the calculated CRC is correct; NAK if the CRC is incorrect

RETURN BOOT SECTOR CRC

Synopsis:	Return Boot Sector CRC.	
ASCII	GS	BEL
Hexadecimal	**1D**	**07**
Decimal	29	7

Returns: 3 byte

Values: ACK <low byte> <high byte>

Description: Returns the CRC calculated over the boot sector code space.

ERASE ALL FLASH CONTENTS EXCEPT BOOT SECTOR

Synopsis:	Erase all flash contents except boot sector.	
ASCII	GS	SO
Hexadecimal	**1D**	**0E**
Decimal	29	14

Return value :	**OK**	**Fault**
ASCII	ACK	NAK
Hexadecimal	**06**	**15**
Decimal	6	21

Description: Causes the entire flash memory to be erased.

The printer returns ACK if the command is successful; NAK if it is unsuccessful.

Note: Available only in download mode.

RETURN MAIN PROGRAM FLASH CRC

Synopsis:	Return main program flash CRC.	
ASCII	GS	SI
Hexadecimal	**1D**	**0F**
Decimal	29	15

Returns:	3 bytes		
Values:	ACK	<low byte>	<high byte>

Note: Returns the CRC calculated over the flash firmware code space.

ERASE SELECTED FLASH SECTOR

Synopsis:	Erase selected flash sector.		
ASCII	GS	DLE	n
Hexadecimal	**1D**	**10**	**n**
Decimal	29	16	n

Value and range	**n :**	0	64 Kbytes Internal Flash
		1	72 Kbytes Internal Flash

Description: Erases the previously selected sector.

The printer transmits ACK when the sector has been erased. If the previous sector is not successfully erased, or if no sector was selected, the printer transmits NAK.

Notes: Available only in download mode.

DOWNLOAD TO ACTIVE FLASH SECTOR

Synopsis: Erase selected flash sector.

ASCII	GS	DC1	al	ah	cl	ch	d1…dn
Hexadecimal	**1D**	**11**	**al**	**ah**	**cl**	**ch**	**d1…dn**
Decimal	29	17	al	ah	cl	ch	d1…dn

Value of :

al = Low byte of address.
ah = High byte of address.
cl = Low byte of the count.
ch = High byte of the count.
d = Data bytes , from 1 to n.

Formulas:

Address start = ((ah* 256) + al)
Count = n = ((ch * 256) + cl)

Limits: Address start + Count ≤ 10000 (Hex)

n number of data bytes	Range of address (al ah)	Range of Count (cl ch)
((ch * 256) + cl)	0000 - FFFF (Hex)	0001 - FFFF (Hex)

Description: Contains a start address (ah x 256 + al) and count (ch x 256 + cl) of binary bytes to load into the selected sector, followed by that many bytes. The start address is relative to the start of the sector. Addresses run from 0 to xxK.

The printer may return one of several responses. ACK means that the data was written correctly and the host should transmit the next block. NAK means that, for some reason, the data was not written correctly. This could mean that communications failed or that the write to flash failed. The alternatives seem to be to retry the block or halt loading and assume a hardware failure.

Notes: Available only in download mode.

ERASE BOOT SECTOR, DOWNLOAD NEW CODE

Synopsis: Erase boot sector and download new boot code.

ASCII	US	SOH	*d1…dn*
Hexadecimal	**1F**	**01**	**d1…dn**
Decimal	31	1	*d1…dn*

Description: Verify new code and Download new boot code.

6.1.15 Ticket Handling

EJECT TICKET

Ejects a ticket that has been previously loaded into printer. If no ticket is currently loaded, the printer would still run the eject sequence.

ASCII	US E n
Hexadecimal	**1F 45 n**
Decimal	31 69 n

The value of parameter n is not relevant
Use real time command 10 04 n to monitor the ticket position / status

LOAD TICKET

Printer loads ticket currently presented at entry or waits until the ticket is detected.

ASCII	US y n
Hexadecimal	**1F 79 n**
Decimal	31 121 n

The value of parameter n is not relevant.
Use real time command 10 04 n to monitor the ticket position / status.

6.1.16 Configuration Commands

The following commands are designed to modify the controller configuration and store the new settings in NVRAM.
Those commands are typically used in factory environment, when assembling the controller board with the mechanism.
Note that the new settings become active after the printer is rebooted.

6.1.16.1 Mechanism

SET PRE-HEATING MODE

Synopsis:	Set Print head pre-heating mode (NVRAM).			
ASCII	US	ETX	*VT*	*n*
Hexadecimal	**1F**	**03**	**0B**	**n**
Decimal	31	3	*11*	*n*

Operand:	n	= Mode selection
Value Decimal	0	Disabled
	1	Enabled
Default	0	

Limit:	Dec:	$0 \le n \le 1$
	Hex:	$00 \le n \le 01$

Description: This command will store the print-head pre-heating option in non-volatile memory (NVRAM).
Note: When this mode is enabled, the controller monitors the print-head temperature and keeps it above 19°C.
This command must be followed by a reset.

SET PRINT DENSITY

Synopsis:	Set print density (NVRAM).					
ASCII	US	VT	*N*	*R*	*J*	*n*
Hexadecimal	**1F**	**0B**	**4E**	**52**	**4A**	**n**
Decimal	31	11	*78*	*82*	*74*	*n*

Operand:	n	= Percentage of the nominal heating time value
Default	100%	

Limit:	Dec:	$80 \le n \le 120$
	Hex:	$50 \le n \le 78$

Description: Set the print density (energy applied to paper) in percent relative to nominal energy.
This command will store the Value in non-volatile memory (NVRAM).
Note : This command must be followed by a reset.

WARNINGS!!

- **Choose a print density setting no higher than necessary to achieve acceptable print density.**
- **Failure to observe this rule may result in a printer service call.**

- **Failure to observe this rule may void the printer warranty.**
- **Consult your Axiohm technical support specialist if you have questions.**

6.1.16.2 Communication (Interface)

See also § Specific Boot Commands.

SET COMMUNICATION INTERFACE PARAMETERS

Synopsis: Set communication interface parameters (NVRAM).

ASCII	US	STX	*n1*	*n2*	*n3*	*n4*	*n5*	*n6*
Hexadecimal	**1F**	**02**	**n1**	**n2**	**n3**	**n4**	**n5**	**n6**
Decimal	31	2	*n1*	*n2*	*n3*	*n4*	*n5*	*n6*

Operands:

	n1	Interface selection
	n2 – n6	Parameters
Default	(*)	RS232 , 115200, n , 8 , 1

Values (Hex)

n1 :	-	= x00 = Interface ➔ RS232	(*)
n2 :	Bit [0..2]	= x03 = Baud rate ➔ 9600	
“	“	= x04 = Baud rate ➔ 19200	
“	“	= x05 = Baud rate ➔ 38400	
“	“	= x06 = Baud rate ➔ 57400	
“	“	= x07 = Baud rate ➔ 115200	(*)
“	Bit 4	= x00 = Number of stop bits ➔ 1	(*)
“	“	= x08 = Number of stop bits ➔ 2	
“	Bit 5	= x00 = Number of Data bits ➔ 8	
n3 :	-	= x00 = Parity ➔ Odd	
“	-	= x01 = Parity ➔ Even	
n4 :	-	= x00 = Parity Mode ➔ No parity	(*)
“	-	= x01 = Parity Mode ➔ Enable parity	
n5 :	-	= x00 = Handshaking ➔ Xon / Xoff	
“	-	= x01 = Handshaking ➔ Dtr / Dsr	(*)
n6 :	-	= x00 = Error processing ➔ Ignore	(*)
“	-	= x00 = Error processing ➔ Print : ?P = Parity Error. ?F = Framing Error. ?O = Over run Error.	

Description: This command will store the communication options in non-volatile memory. (NVRAM)

Notes: The sequence will be ignored if one of the parameters is missing or not valid.

1) **This command is processed only in boot mode. If the printer is running in normal mode, send first command “switch to Boot Mode” (1B 5B 7D).**
2) **This command must be followed by “Printer Reset” command (1D FF).**

DEFAULT CODE PAGE RESIDENT FONT

Synopsis: Set default code page resident font (NVRAM).

ASCII	US	ETX	*Ç*	*n*
Hexadecimal	**1F**	**03**	**80**	**n**
Decimal	31	3	*128*	*n*

Operand: n = code page selection

Value Decimal	0	437 : US
	6	858 default
Value Hex	00	437 : US
	06	858 default

Description: This command will store the default code page in non-volatile memory (NVRAM).

Note: The default code page selects which code page will be initially used by the printer until it is changed using the “ESC t” command.

This command must be followed by a reset.

7 RECOMMENDATIONS

7.1 Management of Error Modes

- In case of error discovered in the introduction, the ticket is ejected and the authorization of introduction is maintained except when the ticket is blocked in the printer. (entry's opto without detection paper).

- In case of file's sending without code of introduction's authorization, data are purged.

- In case of ticket's blocking in the printer, the error mode is activated and the LED blinks.
Only a reset hardware restarts the printer in functioning.
This reset is possible either by disconnection of the card or by buffer's purging (10 05 02 real time USB) followed by the reset code (1D FF).

- In case of too long printing error with regard to the ticket (double printing on simple ticket), another error mode is activated but this one does not require a reset to be cancelled. After a withdrawal of the ticket, in the following introduction's code, the LED will not blink any more and the error will have disappeared.
On the other hand, the data supplementary will be erased by the buffer during the withdrawal of the ticket.
This type of error informs the user of an error by the blinking of the LED but does not block the printer.

- After ejection of the ticket, data following are purged.
We can print, on no account, two simple tickets (one after the other one) by the sending of a single file containing two tickets (with two codes of introduction and ejection).
It will be necessary to send two separated files or to use a double ticket.

OTHER RECOMMENDATION

- Do not pull on the card while it is printed.
- Do not operate or plug the printer without cover.
- Do not insert any tool in the printer slot.
- Avoid environment with mechanical stress (Vibrations) or liquids projections.
- It is preferable to connect the printer to the terminal first then to the Power Supply.